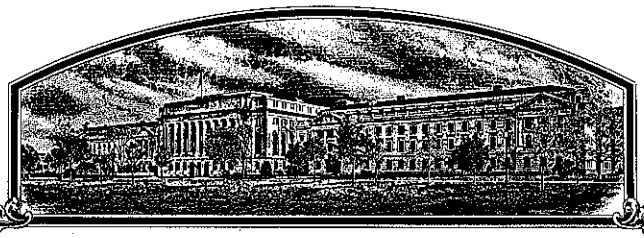

No. 9100164

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT TY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'2510'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 28th *day of* May *in the year of our Lord one thousand nine hundred and ninety-three.*

Attest:

Kenneth B. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Pioneer Hi-Bred International, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
WBA082E2

3. VARIETY NAME
2510

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
Dept. of Wheat Breeding
R.R. 1 Box 297A
Windfall, IN 46076

5. PHONE *(Include area code)*
(317) 945-7906

FOR OFFICIAL USE ONLY

PVPO NUMBER
9100164

FILING
Date: April 15, 1991
Time: ☑ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $2,150.-
Date: April 15, 1991
Certificate Fee: $250 -
Date: Apr. 29, 1993

6. GENUS AND SPECIES NAME
Triticum aestivum

7. FAMILY NAME *(Botanical)*
gramineae

8. CROP KIND NAME *(Common Name)*
Wheat

9. DATE OF DETERMINATION
August 1, 1989

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Iowa

12. DATE OF INCORPORATION
May, 1926

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Gregory C. Marshall
Pioneer Hi-Bred International, Inc.
R.R. 1 Box 297A
Windfall, IN 46076
PHONE *(Include area code)*: (317) 945-7906

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

a. ☑ Exhibit A, Origin and Breeding History of the Variety.
b. ☑ Exhibit B, Novelty Statement.
c. ☑ Exhibit C, Objective Description of Variety.
d. ☑ Exhibit D, Additional Description of Variety.
e. ☑ Exhibit E, Statement of the Basis of Applicant's Ownership.
f. ☑ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 4/10/91.
g. ☑ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☐ YES *(If "YES," answer items 16 and 17 below)* ☑ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____.)
☑ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☑ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Gregory C. Marshall	Coordinator of Soft Red Winter Wheat Breeding	4/10/91
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

FORM CSSD-470 (5-89) Edition of FORM LS-470, 3-86, is obsolete.

14A. Exhibit A. Origin and Breeding History of Pioneer Wheat Cultivar 2510.

Pioneer cultivar 2510, Triticum aestivum L., em Thell., a soft red winter wheat was developed by Pioneer Hi-Bred International, Inc. from the four parent cross: 'Aurora'/Pioneer line 'W689D-2'//Pioneer cultivar '2553'/'Caldwell'. Aurora is a hard red winter wheat from Russia which has the 1BL/1RS translocation. Pioneer line W689D-2 is an F_7 generation selection from the same bulk which became Pioneer cultivar '2550'. Pioneer cultivar 2553 is a soft red winter wheat developed and released by Pioneer Hi-Bred International in 1982. Caldwell is a soft red winter wheat developed and released by Purdue University in 1981.

The two single crosses: Aurora/W689D-2 (designated 'WBZ420') and 2553/Caldwell (designated 'WBZ559') were made in the fall 1979 greenhouse cycle. The final cross: WBZ420/WBZ559 was made in the fall 1980 greenhouse cycle and coded 'WBA082'. The F_1 was grown in the 1981 transplant nursery at Windfall, IN. The F_2 was grown in plots at Ft. Branch and Windfall, IN in 1982 and 200 heads were harvested from the Windfall plot. The F_2 heads were individually threshed and planted as F_3 headrows in the fall of 1982. For each of the F_4 - F_6 generations, eight heads were selected from desirable rows and four headrows were grown at each of two locations. In 1986, one F_6 headrow was harvested in bulk at Windfall for entry into preliminary yield testing. It was designated 'WBA082E2'. Beginning in 1987, WBA082E2 has been

14A. Exhibit A. (con't.)

evaluated for grain yield, agronomic traits, disease reaction, milling, and baking properties. In 1988, 200 heads were harvested and individually threshed to be planted as purification headrows within a 0.2 acre bulk increase at Windfall, IN. Offtype headrows were destroyed prior to harvest and each row harvested separately. The bulk increase was rogued for offtype plants. The seed from individual headrows and the bulk increase were turned over to Pioneer's Parent Cereal Seed group for further increase. The bulk seed constitutes breeder seed. WBA082E2 was designated 'YW593' and 'XW593' after the 1989 and 1990 harvests, respectively.

2510 has shown uniformity and stability for all traits described in Exhibit C of this application.

14B. Novelty Statement

2510 is most similar to Pioneer cultivar 2550. One parent of 2510 is an F_7 selection from the bulk which became 2550 so the resemblence between the two could be expected. Despite their similarities, there are several distinct differences between 2510 and 2550. The grain yield of 2510 is about 16% greater than that of 2550 (Table 1). The test weight of 2510 averages one pound heavier than that of 2550 (Table 1). 2510, on average, heads three days later and is 2 cm shorter than 2550. The straw of 2510 is significantly stronger than that of 2550 (Table 1). The leaf and stem rust, fungal leaf blight, and powdery mildew resistance of 2510 are significantly greater than those of 2550. The flag leaf of 2510 is erect and twisted at boot stage while that of 2550 is recurved and not twisted. The head of 2510 is dense while that of 2550 is lax. The glumes of 2510 are medium length while those of 2550 are long. The kernels of 2510 are shorter and wider than those of 2550.

FORM APPROVED: OMB NO. 0581-0066

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Pioneer Hi-Bred International, Inc

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
Dept. of Wheat Breeding
R.R. 1 Box 297A
Windfall, IN 46076

FOR OFFICIAL USE ONLY
PVPO NUMBER: 9100164
VARIETY NAME OR TEMPORARY DESIGNATION: 2510

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:
[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:
[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____ [1] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:
[2][2][8] FIRST FLOWERING [2][3][5] LAST FLOWERING

4. MATURITY (*50% Flowering*):
[ ][ ] NO. OF DAYS *EARLIER* THAN ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS
[0][5] NO. OF DAYS *LATER* THAN ..... [1] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (*From soil level to top of head*):
[0][9][5] CM. HIGH
[ ][ ] CM. TALLER THAN ..... [ ]
[0][4] CM. SHORTER THAN ..... [1] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):
[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:
[1] 1 = YELLOW 2 = PURPLE

8. STEM:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
[0][4] NO. OF NODES (*Originating from node above ground*)
[1] Waxy bloom: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[1][9] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:
[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[1] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[1][4] MM. LEAF WIDTH (*First leaf below flag leaf*)
[2][2] CM. LEAF LENGTH (*First leaf below flag leaf*):

FORM LMGS 470-6 (6-82) (Formerly Form LPGS 470-6 (3-79), which may be used)

11. HEAD:

[2] Density: 1 = LAX 2 = DENSE

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[2] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[2] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[0][8] CM. LENGTH [1][3] MM. WIDTH

12. GLUMES AT MATURITY:

[2] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[3] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[2] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[2] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[3] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[4] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0][6] MM. LENGTH [0][4] MM. WIDTH [3][5] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[1] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST (Races) _____ [2] LEAF RUST (Races) _____ [0] STRIPE RUST (Races) _____ [0] LOOSE SMUT

[2] POWDERY MILDEW [0] BUNT [2] OTHER (Specify) Wheat soilborne mosaic virus, Wheat spindle streak mosaic

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID (Bydv.) [0] GREEN BUG [0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACES: [0] GP [0] A [1] B [1] C [0] D [1] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	2550	Seed size	Cardinal
Leaf size	2548	Seed shape	Cardinal
Leaf color	2555	Coleoptile elongation	2550
Leaf carriage	Becker	Seedling pigmentation	2550

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

14D. Exhibit D. Additional Description of the Variety.

Pioneer cultivar 2510 is a common soft red winter wheat, Triticum aestivum L., em Thell..

The flowering date of 2510 is about five days later than the cultivar 'Arthur'. When seeded about October 1 at Windfall, IN, 2510, on average, begins flowering May 22 or 228 days after emergence. Flowering is complete about seven days later.

2510 has averaged 95 cm in height (Table 1) about 5 cm shorter than Arthur and 2 cm shorter than 2550.

Plant color of 2510 at booting is green, similar to Pioneer cultivar '2551'. Anther color of 2510 is yellow.

Anthocyanin has not been detected in stems nor has a waxy bloom been noted in 2510. Internodes are hollow and yellow at maturity. There are normally four internodes above ground and the average distance between the flag leaf node and the one below is 19 cm. Hairs are present on the last rachis internode.

The auricles of 2510 are free of anthocyanin although hairs are present.

The flag leaf of 2510 is erect and twisted at boot stage. The leaf below the flag leaf averages 1.4 cm in width and 22 cm in length. Hairs are not present on the first leaf sheath and there is no waxy bloom on the flag leaf sheath.

Spikes of 2510 are generally apically awnletted, dense, tapering, and yellow at maturity. They average 8 cm in length and 1.3 cm in width. Spike size can vary with different plant populations and productivity levels.

14D. Exhibit D. (con't.)

The glumes of 2510 are medium length, wide and glaborous. The glume shoulder is oblique and the glume beak acute.

Coleoptile color is white and seedling anthocyanin absent in 2510. Juvenile plant growth is erect.

Kernels of 2510 are red, ovate and have rounded cheeks. The brush is medium length and is not collared. The crease is narrow and shallow. Kernels average 6 mm and 4 mm in length and width, respectively, and average 35 grams per thousand. Seed size can vary from environment to environment depending on the conditions encountered. Phenol reaction of 2510 is very dark brown similar to Pioneer cultivar 2550.

2510 is resistant to prevelant races of leaf rust (Puccinia recondita f.sp. tritici) and stem rust (Puccinia graminis f.sp. tritici) in the soft red winter wheat region. Based on seedling tests with selected isolates of leaf and stem rust, 2510 is postulated to have Lr 3, 10, 26 and Sr 17, and 31. These tests were conducted by the Plant Disease Clinic at the Univ. of Minnesota in cooperation with the USDA Cereal Rust Lab. 2510 has not been tested for resistance to specific races of stripe rust (Puccinia striiformis), loose smut (Ustilago tritici), or bunt (Tilletia foetida and T. caries). 2510 has exhibited good resistance to powdery mildew (Erysiphe graminis f.sp. tritici) in the Corn Belt (Table 1). 2510 possesses the 1BL/1RS translocation from Aurora and therefore also should have

14D. Exhibit D. (con't.)

resistance genes Pm 8 and Yr 9 which are linked to that translocation.

2510 has resistance to wheat soil borne mosaic and wheat spindle streak mosaic viruses. It has moderate resistance to wheat streak mosaic virus. It has not been tested for tolerance to barley yellow dwarf virus.

Data from greenhouse screening test have indicated 2510 is susceptible to biotypes B, C, E, and L of Hessian fly. It has not been tested for resistance to biotypes GP, A, D, F, or G. It has not been tested for resistance to sawfly, greenbug, or cereal leaf beetle. Hessian fly tests were conducted by the Small Grains Insect Pest Resistance Group, Dept. of Entomology, Purdue Univ., West Lafayette, IN.

2510 has an excellent yield record when compared to other currently available soft red winter wheat cultivars. Short, strong straw provide excellent resistance to straw lodging. High levels of resistance to fungal leaf blight, rust, powdery mildew, and virus infection provide 2510 with excellent plant health.

The milling and baking properties of 2510 are very good and generally similar to most soft red winter wheat cultivars currently available.

Table 1. Performance of Pioneer cultivars 2510, 2550, 2551, and 2555 in yield trials grown in 1986-1990.

Trait	loc/exp	2510	2550	2548	2555
Grain yield (bu/a)	49	88.7	76.6**	84.8**	80.4**
Test Weight (lb/bu)	35	57.9	56.9**	57.9	56.6**
Days to 50% Flowering After Jan.1.	10	139.	136.**	136.**	135.**
Plant Height (cm)	13	95.	97.	93.	98.
Lodging Score	5	7.9+	6.7*	7.8	7.3
Winterhardiness	2	7.8+	7.8	7.0	5.8
Leaf Rust	7	8.4+	5.4**	7.1	7.1**
Stem Rust	2	9.0+	5.8*	8.5	5.8
Fungal Leaf Blight	5	6.4+	3.0*	3.8**	3.8**
Powdery Mildew	6	8.7+	5.3**	6.3*	5.3**
Spindle Streak Mosaic Virus	8	7.9+	7.1	4.2**	7.4*
Soil Borne Mosaic Virus@	4	8.6+	8.3	3.5*	8.8
Wheat Streak Mosaic Virus	3	4.0+	4.5	3.8	4.2

Yield trials were grown in eastern Kansas, Missouri, Iowa, Illinois, Indiana, Ohio, Michigan, Pennsylvania, and Maryland.

+ Scale of 1-9 where 9= resistant or excellent, 1= susceptible or poor.

@ Data collected at the Univ. of Ill. Soil Borne Mosaic Virus nursery.

*,** Significantly different than 2510 at the 5% and 1% levels re spectively. Individual t-tests were calculated comparing the difference between 2510 and the selected cultivars. Significance depends on the range of the differences.

Loc/exp is an experiment grown at a location. Different experiments may have been grown at the same location.

Table 2. Quality test results of 2510, 2550, 2551, and 2555 from the Pioneer Wheat Quality Lab.

Year/Cultivar	Flour Yield %	Break Flour %	Flour Protein %	PSI %	AWRC %	Cookie Diameter cm
1987 (2 reps)						
2510	75.1	39.1	9.0	--	53.4	19.8
2550	70.8	36.8	9.6	--	54.2	19.7
2551	70.2**	35.7*	10.3**	--	53.7	19.1
2555	72.5	40.9	9.2	--	52.0*	20.3
Ave. Check	70.7	39.0	9.0	--	53.5	19.7
1988 (1 rep)						
2510	71.1	33.3	8.7	33.2	52.2	19.4
2550	68.0	32.1	8.9	33.2	53.2	19.4
2551	66.6	29.6	9.9	31.4	54.1	19.3
2555	69.7*	35.9	9.1	38.0	50.6	19.8
Ave.Check	68.8	32.6	9.5	32.4	53.3	19.3
1989 (2 reps)						
2510	73.4	38.3	6.6	--	56.2	20.5
2550	69.2	36.3**	7.1**	--	55.5	20.8
2551	70.5	35.4	8.0	--	54.0	19.7*
2555	72.4	41.1	6.7	--	53.0	20.5
Ave. Check	70.3	37.3	7.1	--	54.6	20.1

Grain from yield trials grown at Ft. Branch and Windfall, IN, Ogden, IL, Blissfield, MI, and Napolean, OH was used for quality evaluation in the various years.

*, ** Significantly different than 2510 at the 5% and 1% levels respectively. Individual t-tests were calculated comparing the difference between 2510 and the selected cultivars. Significance depends on the range of the differences.

Average check equals the mean performance of selected check cultivars with known levels of performance for the various quality characteristics. Cultivars used as checks include Caldwell, 2550, 2551, 2548, and 2555.

Methods: Milling - Brabender Quadromat Sr. mill.
Protein - Dickey-john GACIII NIR analyzer.
PSI - AB grinder, sieve shaker.
AWRC - micro method on milled flour.
Cookie diameter - Total diameter of two cookies.

14E. Exhibit E. Statement of the Basis of Applicant's Ownership

Pioneer Hi-bred International, Inc., Plant Breeding Division, believes it is the sole, original, and first breeder of 2510 cultivar of soft red winter wheat for which it solicits a certification of protection.